

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2004/000900

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. ⁷: C12Q 1/68

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

SEE BELOW

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SEE BELOW

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Databases: WPIDS, MEDLINE, CA

Keywords: methylation; cytosine/cytidine/isocytosine/methylcytosine/methyl cytidine;
deaminase/aminohydrolase/apobec/AID.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Pham, P. et al., 2003 (July), Processive AID-catalysed cytosine deamination on single-stranded DNA simulates somatic hypermutation, <i>Nature</i> , 424: 103-107.	1-38
A	Bransteitter, R. et al., 2003 (April), Activation-induced cytidine deaminase deaminates deoxycytidine on single-stranded DNA but requires the action of RNase, <i>Proceedings of the National Academy of Sciences USA</i> , 100(7): 4102-4107.	1-38
A	Petersen-Mahrt, S. K. and Neuberger, M. S., 2003(May), <i>In vitro</i> deamination of cytosine to uracil by apolipoprotein B editing complex catalytic subunit 1 (APOBEC1), <i>Journal of Biological Chemistry</i> , 278(22):19583-19586	1-38

☒ Further documents are listed in the continuation of Box C

☒ See patent family annex

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

20 August 2004

Date of mailing of the international search report

30 AUG 2004

Name and mailing address of the ISA/AU

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Rein, T. et al., 1998, Identifying 5-methylcytosine and related modifications in DNA genomes, <i>Nucleic Acids Research</i> , 26(10):2255-2264.	1-38
A	Clark, S. J. et al., 1994, High sensitivity mapping of methylated cytosines, <i>Nucleic Acids Research</i> , 22(15):2990-2997.	1-38
A	WO 2002/061124 A2 (Epigenomics AG) 8 August 2002	1-38
A	CA 2462928 A1 (Epigenomics AG) 8 May 2003	1-38

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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 1-38 (all in part)
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
See Supplemental Box
3. ☐
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

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Supplemental Box

Continuation of Box No II:

The full scope of the claims has not been searched because the claims do not comply with rule 6.3. of the PCT. The claims are not clearly defined in terms of the technical features of the invention. The present invention appears to lie in a method for detecting alkylated cytosine in a sample based on the use of a cytosine deaminase that differentially modifies alkylated cytosine and cytosine, such that within the sample cytosine is deaminated to yield uracil while 5-methylcytosine residues are unchanged. The present claims are not limited to methods based on the use of a cytosine deaminase, hence the claims are not limited to the technical features of the invention.

Claims 1-38 have only been searched insofar as they relate to a method for detecting the presence or level of alkylated cytosine in a DNA sample wherein the enzyme that differentially modifies alkylated cytosine and cytosine (see part (c) of claim 1) is a cytosine deaminase.

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This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member			
WO	2002/061124	DE	10104938	EP	1358358
CA	2462928	DE	10154318	EP	1438436
				WO	2003/038120
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.					
END OF ANNEX					